LUBRICATION

CASTOOL TOOLING SYSTEMS

At the end of each extrusion cycle, the dummy block must separate cleanly from the butt, without removing the section from the die, and without breaking the mandrel cone in the dummy block.

Aluminum sticking can be a serious problem, especially when using the softer alloys, and with larger billets. It is absolutely essential, therefore, to lubricate both the billet and the dummy block to make separation easier.

PURPOSE

- **To help instantly and cleanly separate the dummy block from the billet at the end of each extrusion cycle, without pulling extruded section from the die**
- **Aluminium alloys stick to steel at or above 450°C, and becomes more of a problem the larger the billet diameter, because of the increased surface area**

FUNCTION

- **A carefully measured amount of lubricant is applied on the billet face**
- **Excess lubricant is an unnecessary cost, and a workplace pollutant**
- **Every effort must be made to eliminate the possibility of any non-metallic substance getting into the extruded product**
- **Lubricant can be applied either as a powder or a water-based suspension**

Liquid Billet Lubrication System

ALU-JECT is a soluble lubricant made up of a blend of acids and salts to form a soap. The lubricant dries onto the billet forming a lubricant barrier protecting the dummy block from the aluminum billet and allowing the dummy block to easily retract without any adhesion to the billet.

Operation

When the trigger (24 vdc) from the press is received (billet in position) the spray cycle is executed. The spray head extends and seals against the outer diameter of the billet. Atomized lube is sprayed on the billet face. Spray head then returns back and provides a signal (cycle completion) back to the press PLC.

Spray Head Stand Footprint: 1.5′ W x 3.5′ H x 4.5′ L 457mm W x 1066mm H x 1371mm L Lube Unit Controller Footprint: 2′ W x 4′ H x 1.5′ L 609mm W x 1219mm H x 457mm L	Power: 120/240 vac Air: 90psi
Controller & Hardware • Moeller/Eaton PLC EASY512-DC-RCX • 6″ Linear Non Rotating Actuator with Pressure and Flow Control Valve • Diaphragm Pump • Gerlieva Spray Head with Atomizing Nozzles • Green Led: Power On • Red Led: Low Lube • Test Cycle Push Button • Purge Cycle Push Button • 4 Axis Adjustable Spray Head Stand • User Manual	**Tank** • Stainless Steel 4.75 Gal/18 Litre Capacity Tank • Mesh Filter for pouring the Lube • Two Level Indicator Windows • Lube Agitator

BENEFITS of the Castool Lubrication System

- **Improved safety, as there is no fire risk**
- **No graphite or oil contamination**
- **No health risks**
- **Product quality of extruded profile is enhanced**
- **Costly downtime reduced**
- **Tooling life increased**

With the lubrication system, Castool again sets a new standard of excellence in the extrusion industry.

Results may vary depending on individual press characteristics and setup.

AEC MEMBER ALUMINUM EXTRUDERS COUNCIL

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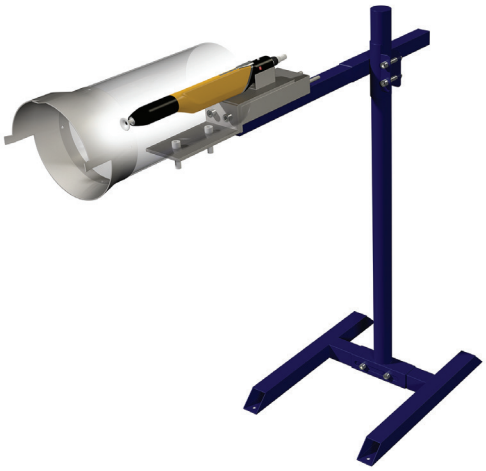

Powder Billet Lubrication System

Castool's GEMA applicator has been designed to adapt to almost any required configuration. The GEMA applicator utilizes the electrostatic technology to spray Boron Nitride Power.

The structure of Boron Nitride is very similar to graphite but with 25% better friction coefficient than graphite. Boron Nitride possesses dielectric property, which can be polarized to spray and adhere onto the billet with consistent dosage and coverage. Experience has shown that Boron Nitride only needs to be applied for every 5 billets.

Release Agents

Greases and oil-based graphite suspensions can only be applied by hand. They are cheap, but require a worker to be present at all times. These materials are inflammable at high temperature. This can cause problems with electrical equipment. Also explosions create blisters in the billet, which can lead to small holes in the extruded profile. This cannot be tolerated by most markets today. Handling is also messy, and the material is environmentally problematic.

Acetylene is ignited in front of the billet, generating carbon black. Acetylene was the first technology to operate automatically, since the flame is lit as the billet passes the burner on its way out of the preheating furnace. Carbon is a good release agent, but due to its small size, carbon black is a carcinogenic. Workers must be protected against breathing in any powder that does not stick to the billet. This also causes problems with the quality of the extruded profile. It can create black marks on the profile that cannot be removed and interfere with anodizing.

The application of electrostatic Boron Nitride (BN) is a good alternative. Its release and lubrication characteristics outperform carbon black. It is also simple to automate the coating of the billet when using BN. BN is not carcinogenic, is nontoxic and chemically inert. There will be no white marks, even inside the die, therefore there are no marks on the profile surfaces.

Castool Tooling Systems has developed a unique process of application of a liquid soluble lubricant to a preheated extrusion billet prior to loading into the press. The obstacle to their use was the **Leidenfrost** affect, which makes it difficult to coat a surface greater than 450ºC with a water based product. New binders have been developed which makes it possible to now apply water based lubricant to the billet. The process enables improved coverage compared to boron nitride powder application with much less overspray and lower consumable costs.

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